

What is claimed is:

1. A single transistor random access memory cell, comprising:
a transfer gate; and
a storage capacitor with a storage node having an MOS native device with a near zero threshold voltage to form an inversion layer.
2. The cell as in claim 1, further comprising:
an inversion region beneath the transfer gate, which is formed by diffusion of the inversion layer.
3. The cell as in claim 1, wherein:
a doping profile of the transfer gate and a doping profile of the storage capacitor are substantially the same or are substantially different.
4. The cell as in claim 1, wherein
the transfer gate and a capacitor plate being closer together than a minimum line width of a single photomask.
5. The cell as in claim 4, further comprising:
a dielectric spacer between the transfer gate and the capacitor plate.
6. The cell as in claim 1, further comprising:
a shallow trench isolation, STI, insulator having a reduced step height below that of an OD sidewall of a substrate insulator; and
a capacitor plate covering the STI insulator and the OD sidewall.
7. The cell as in claim 6, further comprising:
an inversion region beneath the transfer gate, which is formed by diffusion of the inversion layer.
8. The cell as in claim 6, wherein
the transfer gate has another MOS native device forming an inversion region at a near zero threshold voltage.
9. The cell as in claim 6, wherein
the transfer gate and a capacitor plate being closer together than a minimum line width of a single photomask.

10. The cell as in claim 6, further comprising:
a dielectric spacer between the transfer gate and the capacitor plate.
11. The cell as in claim 1, further comprising:
a shallow trench isolation, STI, insulator having a reduced step height below that of an OD sidewall of a substrate insulator;
the transfer gate and the capacitor being in an active area of the substrate;
an external MOS native device external to the active area, the external MOS native device forming an inversion layer at near zero threshold voltage; and
a capacitor plate covering the STI insulator and the external MOS native device.
12. The cell as in claim 11, further comprising:
an inversion region beneath the transfer gate, which is formed by diffusion of the inversion layer.
13. The cell as in claim 11, further comprising:
the transfer gate having an MOS native device forming an inversion region at a near zero threshold voltage.
14. The cell as in claim 11, further comprising:
the transfer gate and a capacitor plate being closer together than a minimum line width of a single photomask.
15. The cell as in claim 14, further comprising:
a dielectric spacer between the transfer gate and the capacitor plate.
16. A method of making a single transistor random access memory cell, comprising:
forming a substrate in an active area and an isolation region in the substrate;
forming a transfer gate and forming an electrode plate of a capacitor over the substrate in the active area, with the electrode plate covering a portion of the isolation region;
forming beneath the electrode plate a capacitor storage node that becomes an inversion layer at a near zero threshold voltage without a junction storage node; and
forming an inversion region beneath the transfer gate without a P/N junction.
17. The method of claim 16 wherein, forming the inversion region beneath the transfer gate is by diffusion of the inversion layer.

18. The method of claim 16 wherein, forming the inversion region beneath the transfer gate is by forming beneath the transfer gate a doped region that becomes an inversion layer at a near zero threshold voltage.
19. The method as in claim 16, further comprising:
forming the transfer gate by a photomask and photo etch process that does not form the electrode plate; and
forming the electrode plate by a photomask and photo etch process that does not form the transfer gate.
20. The method of claim 16 wherein, forming the inversion region beneath the transfer gate is by diffusion of the inversion layer.
21. The method of claim 16 wherein, forming the inversion region beneath the transfer gate is by forming beneath the transfer gate a doped region that becomes an inversion layer at a near zero threshold voltage.
22. The method of claim 16, further comprising:
recessing a portion of the isolation region lower than a sidewall of the substrate; and
covering the sidewall and the portion of the isolation region.
23. The method of claim 22 wherein, forming the inversion region beneath the transfer gate is by diffusion of the inversion layer.
24. The method of claim 22 wherein, forming the inversion region beneath the transfer gate is by forming beneath the transfer gate a doped region that becomes an inversion layer at a near zero threshold voltage.
25. The method as in claim 22, further comprising:
forming the transfer gate by a photomask and photo etch process that does not form the electrode plate; and
forming the electrode plate by a photomask and photo etch process that does not form the transfer gate.
26. The method of claim 16, further comprising:
forming an external doped region external to the active area; and
covering the isolation region and the external doped region with the electrode plate.

27. The method of claim 26 wherein, forming the inversion region beneath the transfer gate is by diffusion of the inversion layer.

28. The method of claim 26 wherein, forming the inversion region beneath the transfer gate is by forming beneath the transfer gate a doped region that becomes an inversion layer at a near zero threshold voltage.

29. The method as in claim 26, further comprising:

forming the transfer gate by a photomask and photo etch process that does not form the electrode plate; and

forming the electrode plate by a photomask and photo etch process that does not form the transfer gate.